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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,982	11/26/2003	Francois Binette	022956-0237	7987

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EXAMINER	
SINGH, SATYENDRA K	
ART UNIT	**PAPER NUMBER**
1657	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/723,982	BINETTE ET AL.	
	Examiner	Art Unit	
	Satyendra K. Singh	1657	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 25 October 2006.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-21 is/are pending in the application.

4a) Of the above claim(s) 22-43 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-21 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 26 November 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's response and amendments to the claims filed with the office on October 25th 2006 is duly acknowledged.

Claims 22-43 (groups II and III) **remain withdrawn** from further consideration.

Claims 1-21 (group I, with elected species) is examined on their merits in this office action.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-21 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Vyakarnam et al (US Patent 6,534,084 B1, [A]) in view of Albrecht et al [U] and Naughton et al (US Patent 5,842,477; [B]).

Claims are generally drawn to a **tissue repair implant** comprising: a tissue carrier matrix comprising a plurality of biocompatible, bioresorbable **granules** (such as **aliphatic polyesters**) and at least one tissue fragment (such as **cartilage** tissue) in association with the tissue carrier matrix, wherein the tissue fragment comprises an effective amount of viable cells that can migrate out of the tissue fragment and populate the tissue carrier matrix; wherein the tissue carrier matrix is in an injectable form (see specific recitation of instant claims 1-21).

Vyakarnam et al [A] teach a porous, biocompatible, bioresorbable implant (suitable for tissue engineering applications such as for repair of damaged cartilage, tendons and ligaments; see Vyakarnam et al, abstract, summary of the invention, column 12, 1st paragraph, in particular) comprising a biocompatible scaffold such as a three-dimensional interconnected open cell porous foams that have a gradient in composition and/or microstructure through one or more directions; wherein the foams are used as scaffolds and can be made from a blend of adsorbable and biocompatible aliphatic polymers (such as copolymer of 95:5 lactide and **glycolide**, and alternatively with a mesh component made of a polydioxanone and the foam component made of 35:65 epsillon-caprolactone and glycolide; see Vyakarnam et al, figures 7 a-c; column 6, 2nd and 3rd paragraphs; column 7, 3rd and 4th paragraphs; in particular). The scaffolds taught by Vyakarnam et al are particularly well suited to tissue engineering applications (for bones, cartilage and skin; see Vyakarnam et al, summary of the invention, in particular), and can be designed to mimic tissue transition or interface zones (see Vyakarnam et al, abstract, in particular). Vyakarnam et al teach an implant wherein the implant includes natural polymers such as collagen incorporated in the inner portion of the scaffold (see Vyakarnam et al, column 17, lines 43-49, in particular).

Vyakarnam et al teach an implant wherein the scaffold has an open pore structure with pores having a size sufficient to allow cells and tissue ingrowth (see Vyakarnam et al, abstract, summary of the invention, column 19, 1st and 2nd paragraph, in particular); wherein the polymeric material can be mixed to prepare soft elastomeric copolymer (i.e. suitable for injectable tissue carrier matrix; see example 5, in particular);

wherein the tissue carrier scaffold/matrix can be molded or made in **variety of shapes and sizes** including spherical (i.e. granular or particulate shapes), hemispherical, ellipsoidal, and can be both solid as well as hollow constructs, and combinations thereof (see Vyakarnam et al, column 14, 3rd paragraph, in particular); wherein the scaffold further comprises at least one additional biological component applied thereto, and wherein the at least one biological component comprises growth factors, matrix proteins, peptides, antibodies, enzymes, cytokines, viruses, nucleic acids, isolated cells (including **stem cells**; see Vyakarnam et al column 18, last paragraph, in particular), **platelets**, and combinations thereof (see Vyakarnam et al, column 17, lines 37-65, column 18, 1st and last paragraphs, in particular). In addition, Vyakarnam et al teach a biocompatible implant (as discussed supra) wherein various types of cells can be seeded and grown on the polymeric scaffold in order to generate a gradient structure suitable for tissue repair and replacements, including cartilage, tendons and ligaments.

However, a tissue repair implant comprising a biocompatible scaffold and at least **one tissue fragment** (cartilage tissue) that is associated with the tissue carrier matrix; wherein the matrix further comprises a binding agent (fibrin glue) and further including curing agent (such as thrombin) for anchoring the suspension of tissue fragment to the biocompatible matrix; and wherein the the matrix further includes at least one biological component (such as platelets, or stem cells) is not explicitly disclosed by the invention of Vyakarnam et al [A].

Albrecht et al (IDS) teach a biocompatible, bioresorbable, and injectable implant comprising collagen foam (in the form of small pieces; see Albrecht et al, page 213,

summary, 2nd paragraph, in particular), or fibrin adhesive, or a combination of both along with fine **minced cartilage tissue** (including the viable cells and other biological components contained therein), and an additional biological component for curing such as thrombin used in the closure of osteochondral lesions in experimental animals (see Albrecht et al, summary, page 213, and materials and methods, page 214, in particular). Albrecht et al teach an implant comprising a plastic plug of **fibrin adhesive** with cartilage tissue fragments (such as autogenic tissue) with or without a natural polymer such as porous **collagen foam** (commercial preparation; Tachotop, Hormonchemie, Munich; see Albrecht et al, page 214, *materials & methods*, in particular) and additional biological component such as **thrombin** enzyme. Albrecht et al teach the surgical implantation to repair the defect site wherein the implanted cartilage cells undergo proliferation and in and around the implanted porous scaffold in order to affect tissue remodeling and new cartilage formation (see Albrecht et al, page 217, left column, in particular).

Naughton et al (IDS) teach an implant and a method for repairing cartilage *in vivo* using a biocompatible, non-living three-dimensional scaffold or framework structure in combination with periosteal/perichondrial tissue that can be used to hold the scaffold in place and provides a source of viable cells such as **chondrocytes progenitor cells**, chondrocytes, and other stromal cells for attachment to the scaffold *in vivo* as well as additional components such as use of **fibrin glue** (i.e. an adhesion agent) in order to fix the implanted tissue (from autologous as well as heterologous sources, preferably autologous sources) at the defect site (see Naughton et al, abstract, summary of the

invention, column 7, 3rd and 4th paragraphs; entire columns 8-10; and claims, in particular).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time this invention was made to substitute the biological component i.e. viable cells used with the implant comprising the scaffold material of Vyakarnam et al with at least a tissue fragment (i.e. cartilage tissue fragment), and use a fibrin-based adhesive agent (such as fibrin glue, and including thrombin as a curing agent) that can additionally contain platelets or stem cells as biological components, as disclosed explicitly by the inventions of Albrecht et al, and Naughton et al (see the teachings as discussed, supra).

The person of ordinary skill in the art would have been motivated to make such modification and substitution in the tissue repair implant comprising biocompatible scaffold of Vyakarnam et al because both Albrecht et al and Naughton et al provide the benefits (such as acting as soft, fillable matrix or scaffold having anchoring functions; acting as a source of viable cells such as stem cells, chondrocytes, stromal cells, growth factors, and immunological compatibility; see Naughton et al, abstract, in particular) of using tissue fragments along with additional component such as an adhesive agent (i.e. fibrin glue/adhesive) in the procedure of tissue repair using such tissue carrier implants (see Albrecht et al, summary, in particular).

One of ordinary skill in the art would have had a reasonable expectation of success in making such modifications in the tissue repair implant of Vyakarnam et al because the combined teachings of Albrecht et al and Naughton et al provide the method of using such surgical implants (that can be in the form of injectable

suspension; see Albrecht et al; discussion supra) comprising minced cartilage tissue fragments in the repair of osteochondral lesions or cartilage tissue.

Given the detailed disclosures of prior art references cited above, the specific limitations of claims 5, 8-10, and 21 (size of tissue fragments, average outer diameter of the polymeric granules, surface roughness, and coating of the granules with at least one biological component) would have been a matter of routine optimization by one of ordinary skill in the art at the time this invention was made, as evidenced by the fact that porous scaffold/matrix materials made of glycolide copolymers with similar particle sizes/diameters have been disclosed by both Vyakarnam et al and Naughton et al (see discussion supra), and the fact that Albrecht et al (i.e. collagen **foam particles** mixed with fibrin glue along with **cartilage tissue particles**) and Naughton et al (see teachings in columns 6-8, in particular), both disclose the fact that biological components can be mixed with the polymeric matrix/scaffold materials in order to provide adhesion, cross linking, and coating of the tissue carrier matrix.

Thus, the invention as a whole would have been *prima facie* obvious to a person of ordinary skill in the art at the time the claimed invention was made.

As per MPEP 2144.06 (Functional Equivalents), *In order to rely on equivalence as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art, and cannot be based on applicant's disclosure or the mere fact that the components at issue are functional or mechanical equivalents. In re Ruff, 256 F.2d 590, 118 USPQ 340 (CCPA 1958).*

Obviousness-type Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined

application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1. Claims 1-21 remain provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-35 of copending Application No. 10/374,772 (Binette et al; filed on Feb. 25th 2003; common inventor and assignee, Ethicon Inc., NJ, USA). Although the conflicting claims are not identical, they are not patentably distinct from each other because the pending claims in said application '772 are also directed to a porous, biocompatible tissue repair implant or scaffold (and a kit for repairing a tissue injury using the said scaffold or implant) comprising at least one gel like carrier and at least one tissue fragment having viable cells that can migrate out of the said tissue fragment and populate the tissue carrier or scaffold. The specific limitations of polymeric scaffold materials, biological components or source of tissue fragment, bioadhesive agent, and structural features of the scaffold or implant being very similar or essentially the same as presented in claims 1-21 of the instant invention, as claimed.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

2. Claims 1-21 remain provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-32 of copending Application No. 10/374,754 (Binette et al; common inventor and same assignee, Ethicon Inc., NJ, USA). Although the conflicting claims are not identical, they are not patentably distinct from each other because the pending claims in said application '754 are also generally directed to a porous, biocompatible tissue repair implant or scaffold (having an aspect ratio in the range of about greater than 2 and less than 100) and at least one tissue fragment (in the form of minced tissue particles; having viable cells that can migrate out of the said tissue fragment and populate the tissue carrier or scaffold (see application no.10/374,754, abstract, in particular). The specific limitations of polymeric scaffold materials, biological components or source of tissue fragment, bioadhesive agent, and structural features of the scaffold or implant being very similar or essentially the same as presented in claims 1-21 of the instant invention, as claimed.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Pertinent prior art not relied upon in the Rejections

1. US 2001/0051834 A1 (FRONDOZA et al) Method for composite cell-based implants (entire document).
2. WO 00/15248 (JANOWICZ et al) Growth factor-containing composition for the healing of tissue damage (entire document).

Response to Applicant's Arguments

Applicant's arguments filed with the office on October 25th 2006 (as they pertain to the prior art rejections of record) have been fully considered but they are not persuasive for the following reasons of record.

The instant claims are generally directed to a tissue repair implant comprising a **tissue carrier matrix** having a plurality of biocompatible, bioresorbable **granules** and at least one **tissue fragment** (having effective amount of viable cells) in association with the tissue carrier matrix.

The invention as claimed remains rejected under 35 U.S.C. 103(a) as being obvious over prior art references of Vyakarnam et al in view of Albrecht et al, and Naughton et al. The gist of the arguments presented by applicants stating that "the claims, however, are all patentable because none of the cited art teaches the element of a plurality of biocompatible, bioresorbable granules as recited in the claims" (see remarks, page 9, 2nd paragraph, in particular), has been fully considered but was not found to be persuasive because of the lack of a specific or explicit definition in the instant disclosure with respect to the term "granules" and in view of the dictionary definition of the term "granule" as "a small particle; especially one of numerous particles forming a larger unit" (see Merriam-Webster Online Dictionary, prior art [U2]). The prior art reference of Albrecht et al [U] clearly teaches a tissue repair implant composition comprising a tissue carrier matrix comprising of **small pieces of collagen foam** and at least one tissue fragment of cartilage (see Albrecht et al, page 213, left column,

summary, 2nd paragraph; and materials & methods, test groups IV and V, in particular). Thus, the arguments are unpersuasive of error in the prior art rejection of record.

Moreover, as discussed in the obviousness rejection of record (see previous office action, page 4, 2nd paragraph, in particular), the primary reference of record, Vyakarnam et al, clearly suggests the fact that the tissue carrier scaffold or matrix (especially porous foams that are made of absorbable and biocompatible polymers) can comprise of or can be made or molded in a variety of shapes and sizes (including solid or hollow spheres and ellipsoids, etc.; see Vyakarnam et al, column 14, 3rd paragraph, in particular) depending on the requirement of the tissue being repaired/augmented (see Vyakarnam et al, column 14, 4th paragraph, in particular).

Thus, in the absence of the evidence of criticality, the claimed invention (i.e. a tissue repair implant as recited in claims 1-21) is still deemed obvious over the cited prior art references of record.

Applicant's arguments with respect to the obviousness-type double patenting rejection of record over co-pending applications 10/374,772 and 10/374,754 (common inventors and assignee) were not found to be persuasive because the inventions as claimed are still deemed to be obvious over the claims in the pending application (i.e. 10/723,982) being examined (especially in view of the disclosures in the cited prior art references, as discussed supra, with respect to various shape and sizes of the tissue carrier matrix/scaffold compositions that can be made and used for tissue repair/augmentation applications).

Conclusion

NO claims are allowed.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Satyendra K. Singh whose telephone number is 571-272-8790. The examiner can normally be reached on 9-5MF.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jon P. Weber can be reached on 571-272-0925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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PRIMARY EXAMINER